JPRS 78180

29 May 1981

East Europe Report

SCIENTIFIC AFFAIRS

No. 704

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CONTENTS

CSSR-USSR COOPERATION IN AGRICULTURAL RESEARCH

Prague SVET HOSPODARSTVI in Czech 7 Apr 81 p 3

[Article by JUDr Engr Vaclav Jerman, Federal Ministry of Technological and Investment Development: "CSSR-USSR Cooperation in Agricultural Research"]

[Text] The development of the material-technological basis in the area of agriculture and food in the CSSR is unthinkable without the intensive application of scientific and technological achievements. More rapid solution of individual problems and their practical application in agricultural production and the food industry is facilitated by scientific-technical cooperation with the Soviet Union which is the concrete form of international socialist economic integration.

This cooperation is based on long-term traditions and is implemented in all key sectors of the agricultural-food complex. The goal of cooperation is the joint solution of selected problems which results in expanded specialization and cooperation and also in the further development of mutually advantageous economic relations.

In the area of plant production, the participating research and plant improvement institutes in the CSSR and USSR have been studying the problems of improving the seeds and cultivation of barley for malt, and the problems of improving the seeds and cultivation of wheat and related agronomic techniques.

The biological material has been exchanged and tested under the conditions of both countries. Material obtained in this manner is subsequently used in the plant improvement process in the USSR and CSSR. On the basis of the working plans, the participating institutes have in particular exchanged samples of individual lines, hybrid populations and varieties of spring barley and winter wheat.

Cooperation in improving corn hybrids with higher amino acid content and pest-resistance is based on the mutual exchange of the previously agreed upon quantity of self-pollinating lines, their evaluation under different ecological conditions and the selection and testing of hybrids developed from them. The plant improvement in this area is of a long-term nature and is expected to result in jointly producing very efficient hybrids with a higher lysin content which will be disease and pest-resistant, and which will be suitable for growing in both states. As an example, we can mention that approximately 70 lines and almost 500 joint hybrid combinations have already been tested. These new plant improvement products will enrich our work with new types of corn having excellent protein quality, an indispensable component in the desirable nutrition of domestic animals and particularly of pigs and poultry.

The solution of the problems concerning new selected varieties of single-bud sugar beet involved the mutual exchange of samples of seed of various types of disease-resistant sugar beet. During the research period 5 single-bud Soviet lines were cross-bred with Czechoslovak varieties and this resulted in 25 combinations.

In the area of genetics and plant improvement of legumes, cooperation focused on exchange of information and samples of improved plants, particularly of white lupine. The principal goal is the shortening of the growing period, increase in the yield per hectare and reduction of the tannin content.

Large-scale cooperation is in cultivation, harvesting and postharvest treatment of hops. For this purpose, an agreement was signed between the CSSR and USSR ministries of agriculture which provides for eight research projects. On this basis, two joint units were established which are engaged in scientific research and development of pertinent equipment. The CSSR unit set up at the Hops Research Institute in Zatec studies the problems of mechanized cultivation, while the USSR unit at the Research Institute in Zitomir is engaged in plant improvement. The collective for mechanization of cultivation, harvesting and postharvest treatment of hops is engaged in research and development of structures on hops plantations and mechanized methods of hanging supporting wires for the hops plant. In cooperation with the Soviet experts, the Hops Research Institute in Zatec has designed a platform for hanging of supporting wires for hops which is attached and drawn by tractors. Both states have already experimentally tested new types of structures for hop plantations which will require less building material.

The first joint project sponsored by the unit for plant improvement was the collection of barren hops in the Carpathian area and sampling of seeds of self-pollinated hops in nature. Both partners have planted such seeds in order to enrich their genetic fund. In addition, a methodology was developed for speeding up the plant-improvement process in regard to new varieties which will serve as the basis in the area of hybridization for accelerating the plant-improvement process by 2-4 years. The work is in progress on the model of new varieties of early and semi-early hops with the potential increased yields per hectare in accordance with the conditions and requirements of both partners. Although the two collectives have been engaged in this activity for only a relatively short time, it can be assumed that the chosen form of cooperation in common solutions which provide for the concentration of forces of both partners will speed up scientific research and technical solutions.

In plant production, other problems which concern the development of technologies for cultivation of agricultural products on irrigated lands are also confronted. Thus, for example, an agronomic technology was developed for winter wheat on irrigated lands. Attention was likewise paid to plant improvement and cultivation of sunflower. Special genetic research is conducted in the CSSR on biological material imported from the Soviet Union.

In the area of animal production, it is necessary to stress very efficient cooperation which, taking into account the length of construction period, focuses on the development of progressive types of big industrial complexes for poultry breeding. Research has produced valuable results which are effectively used in technical and economic approach to the design projects. With reference to the "Development

of Experimental Industrial Complexes for Fattening of Geese Suitable for Broiling," the participating experts have jointly formulated the basic technological, economic and organizational principles for design of a complex housing 500,000 geese. The model design of the industrial complex for production of goose meat was used for construction in the USSR which started in 1979.

Cooperation also involved the development of experimental industrial complexes for fattening of turkey hens and chickens for broiling. The emphasis in all these designs is on the high degree of production concentration in order to reduce the investment and production cost.

Work is already in progress on the development of methods for disinfection and treatment of barn manure in large mechanized farms. The goal is the experimental verification of technological lines and development of systems for processing of beddingless manure and dung water from the complexes for pig breeding. The program of cooperation is based on the principle of mutual division of labor and includes experimental testing of necessary technical equipment. The mutual exchange of research results and fertilizing techniques eliminates duplication, reduces capital outlays and makes research capacities available for other projects.

In the food industry, scientific-technical cooperation successfully developed, for example, in improving technological procedures in slaughter of cattle and pigs, and in the development of continuous mechanized slaughter lines. Cooperation in this area has set itself the task of developing continuous mechanized slaughter lines with a capacity corresponding to the conditions of large-scale production prevailing in both countries.

Since 1976, scientific-technical cooperation has also been carried out in the area of intensification of production processes in processing of collagen containing raw materials which are used in manufacture of packaging materials for smoked meat. The results achieved so far are used for accelerating the treatment of raw materials employed in manufacture of artificial protein containing packaging materials and for increasing labor productivity.

In drawing up the Seventh Five-Year Plan, an integral part of which is also the plan of development of science and technology, great emphasis is placed on the intensification of scientific-technical cooperation with the USSR during the 1981-1985 period. In the preparation of the program, the organs in charge of science and technology proceeded from the premise that the selected problems must include those which are listed in the agreement already signed between the CSSR and USSR on the long-term program of production specialization and cooperation. It was agreed that the solution of the problems involved must result in the further development of science and technology, in expansion of mutually advantageous economic relations and also in increased mutual commodity exchange.

For the future 5-year period both cooperating partners have selected and agreed upon nine principal problems for whose solution the research institutes in the CSSR and USSR have already developed detailed work plans. The cooperating research institutes, basing their work on previous achievements have already selected several additional fields in which it will be mutually advantageous in the long run to intensify existing mutual contacts. Among these prospective

projects, for example, is the improvement of technology of treatment and storage of fodder. Within this broad topic, technologies of green fodder ensilaging will be worked out and improved. Appropriate technological facilities and application of chemicals will be proposed and verified. In order to verify new productive solutions, filling and sorting equipment for horizontal ensilaging warehouses with outputs of 75 tons per hour will be tested.

To cut down energy consumption, cooperation will be expanded and intensified in verifying the technology of low-temperature drying and in use of unconventional sources of energy. In the area of baled fodders, economic advantages will be tested of briquetting single or multiple component fodders with a maximum energy consumption of 40 kWh per ton of fodder.

The result of cooperation will be the joint verification of researched technologies and formulation of agronomic requirements which will be incorporated in the design of production equipment and then turned over to the engineering sectors of both countries.

The important tasks of scientific-technical development of the agricultural-food complex, listed in the Seventh Five-Year Plan, are closely related to the development of higher forms of international scientific-technical cooperation with the Soviet Union and other socialist states. The purposeful and mutually advantageous linkage of the scientific and research potential of CEMA member countries creates conditions for effective application of scientific and technical achievements in production and economic cooperation of CEMA member countries.

10501
CSO: 2402/59

SPECIFICATION OF OFFICE COMPUTER "IZOT 250"

Sofia VUNSHNA TURGOVIYA in Bulgarian No 3, 1981 back cover

[Unattributed advertisement: "The IZOT-250 Office Computer"]

[Text] The IZOT-250 office computer is:

A modern unit for processing economic information;
With high technical and economic indicators;
High computing speed;
Using MOS integrated circuits with a high level of integration;
Use of a magnetic disc (floppy disc) storage unit making it possible to have secondary processing for the data in a minicomputer or large computer

Technical specifications:

Control unit:

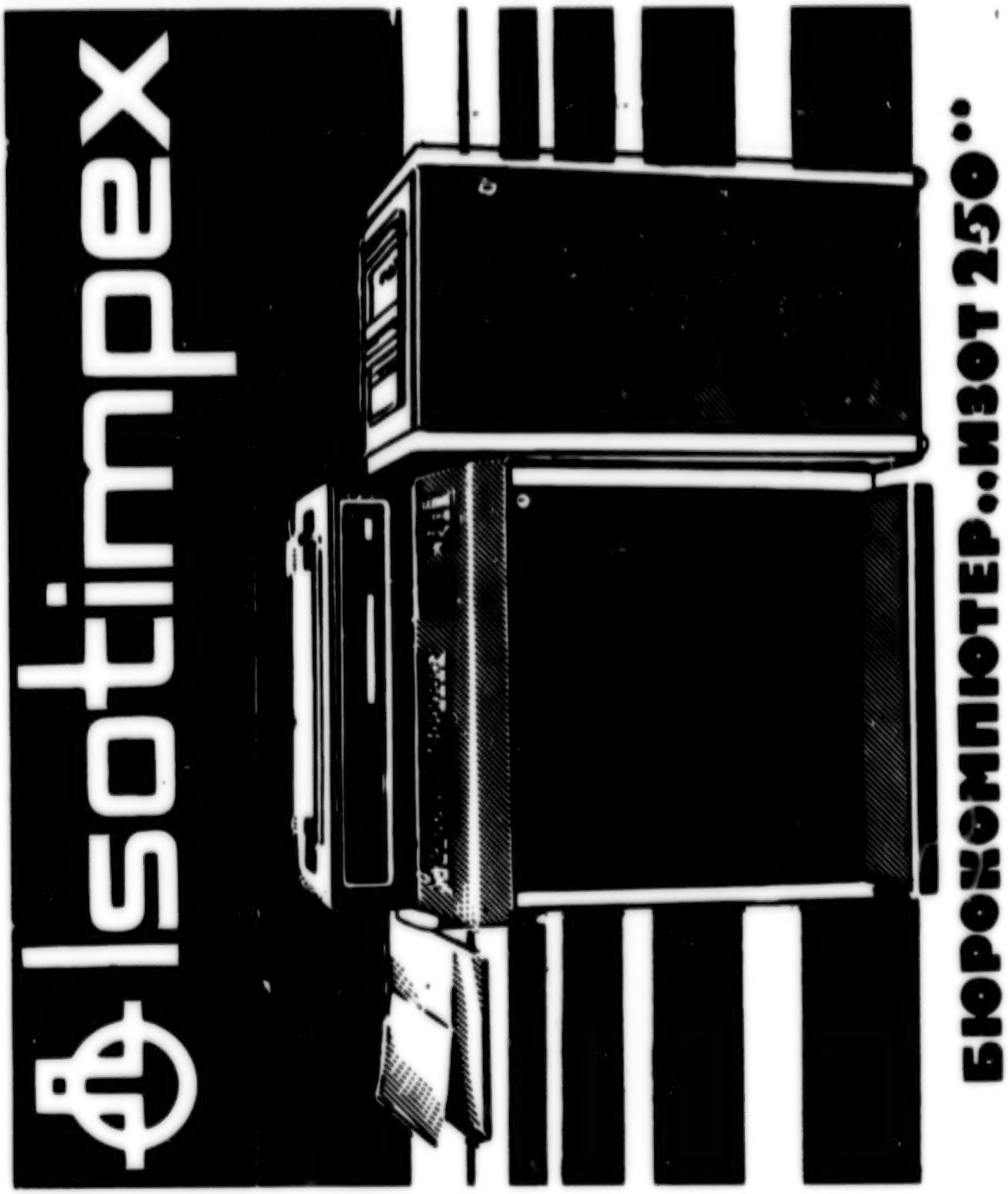
Working storage	12 K
Permanent storage	18 K
512 independent digital registers	
256 text registers	
10 constant registers	
Arithmetical operations:	Addition, subtraction, multiplication, division, percentages
Bit configuration	14 bits

Display:

Digital:	For putting in data and intermediate results
System:	For state of system

Keyboard:

Alphanumerical (Latin, Cyrillic)
System or working
Numerical


isotimpex
БЮРОКОМПЮТЕР „ИЗОТ 250“

Printer:

Speed	30 signs per second
Signs per row	156
Paper width	380 mm

Tabulating
Changeable print disc
Handles perforated paper and blanks

Floppy magnetic disc storage:

250 K per disc
77 tracks

Power voltage: 220 volts, 50 hertz

Programming:

With the aid of a specialized problem-oriented input language; the latter is easily learned with a minimum knowledge of programming. There is a built-in translator.

10272
CSO: 2202/12

ADVERTISEMENT FOR SALE OF COMPUTER DISC PACKAGES

Sofia VUNSHNA TURGOVIYA in Bulgarian No 3, 1981 p 28

[Unattributed advertisement: "Disc Packages from the Izotimpex Foreign Trade Organization"]

[Text]

Basic specifications	Package type				
	ES-5053	ES-5261	ES-5269	ES-5266	ES-5267
1. Capacity (megabits)	7.25	29/58	2.45/5	100	200
2. Number of discs	6	11	1	12	12
3. Number of recording surfaces	10	20	2	20	20
4. Tracks per inch (TPI)	100	100/200	100/200	200	400
5. Bits per inch (BPI)	1100	2200	2200	4400	4400
6. Disc package compatible with:	IBM1311 or equiv.	IBM2314 or equiv.	IBM5440 or equiv.	IBM3330 or equiv.	IBM3300-11 or equiv.
7. Specification No	Dis-2864	Dis-2564	Dis-3562	Dis-4337	Dis 5653

Modern technology
Meeting client requirements

This is the reason to choose us for your suppliers

Izotimpex VTO [Foreign Trade Organization]
Sofia, Bulgaria
Chapayev Street No 51
Tel: 73-61
Telex: 022731

10272
CSO: 2202/17

MEASURES TO REDUCE HAIL DAMAGE IMPLEMENTED

Sofia SOFIA NEWS in English 22 Apr 81 p 2

[Article by Erik Aramov]

[Text]

On a world scale average annual damage caused by hail-storms exceeds 2,000 million dollars, although they are shared by a relatively small number of countries. Bulgaria is one of the countries in Europe which are most frequently hit by hailstorms. Scientists and practicians have long been seeking ways and means of combating this natural calamity.

Modern theory and research have shown that an effective way to combat hails is to artificially disperse hail clouds. For this purpose, special rockets are launched which "imbue" the clouds with chemical substances which, in turn, cause the formation of tiny pieces of hail. Reaching the warm part of the atmosphere these pieces melt to such an extent as to not cause any serious, if any, damage to crops.

A special board was set up in Bulgaria ten years ago which has at its disposal several firing ranges and sites situated in intensive agricultural regions.

For years, from April to September – during the active hailstorm season – atmospheric processes have been the object of observation. Twenty-four hours a day radio location stations watch the skies and transmit information to the command posts.

Bulgarian specialists use Soviet methods developed at the Institute of Geophysics at the Georgian Academy of Sciences. With it, and by means of modern technological equipment, also supplied by the USSR, losses caused by hailstorms to plant growing have been significantly reduced. Besides the range of the Hydrology and Meteorology Chief Direction, the Bulgarian Academy of Sciences, there are special ranges in the districts of Vidin, Mihailovgrad, Vratsa, Pazardjik, Plovdiv and Sliven, which protect a total of 1.3 million hectares of land, of which 860,000 hectares are arable. The beneficial effect in combating this natural disaster is already about 60 per cent. During the current Five Year Plan period (1981-1985) technical means will be reconstructed and modernised. New radio location meteorological equipment will also be introduced.

CSO: 2020

BRIEFS

INCREASED MEDICINE CONSUMPTION--Yearly consumption of drugs in developed countries has increased during the past decade by almost 12 percent. This trend is even higher in Czechoslovakia where 2.4 million of painkilling pills are consumed daily in addition to other drugs. [Bratislava PRACA in Slovak 6 May 81 p 6]

CSO: 2402/61

ACADEMICIAN INTERVIEWED ON SCIENCE POLICY, PROSPECTS

Budapest MAGYAR TUDOMANY in Hungarian No 3, Mar 81 pp 210-214

[Interview with Mihaly Sandori, candidate of technical sciences, by Erika Zador]

[Text] The utilization of scientific achievements played an important role in the preparation of the guidelines for the Sixth Five-Year Plan and the general debates of the proposed plan. I interviewed Mihaly Sandori, candidate of technical sciences, about the present situation and the prospects. The interviewee is competent in this subject for several reasons. For a period of three years, he led the First Main Department of Natural Sciences of the MTA [Hungarian Academy of Sciences], he worked as deputy managing director of the Central Physics Research Institute, and for many years has played an important role in the creation and revival of actual research achievements as an expert and an organizer.

Very large sums have been and shall continue to be expended in Hungary on scientific research, three percent of the national product on the average.

[Question] Are you satisfied that these monies are spent effectively? (This question and all other questions in this interview refer only to technical and natural sciences.)

[Answer] You now expect me to answer in the negative. But the matter is not quite that simple. Scientific achievements obviously result from the expenditures earmarked for research. This is the first step. But only part of the expenditures is translated into reality. This is the second step.

We have no problems with the first step. Whatever international science statistics or scientometric survey we use, we find that Hungary is "above average." The number of publications and scientific achievements per capita or as a percent of the national product is much higher than average. Of course, this does not necessarily mean that there is no room for improvement here; however, problems exist in the second step. Research and industry seem to have difficulties of getting together. I have my own ideas on the reasons for this state of affairs.

[Question] Let us hear the official opinion first.

[Answer] According to the majority of the views, the failure to implement the achievements is attributed to organizational and institutional causes, and it is said that the achievements of research are not needed by industry or are not generated where they are needed.

[Question] Could you give us an example of this?

[Answer] It is difficult to answer this question since I do not wish to hurt anybody's feelings. Thus, I give you a few examples to illustrate the fact that success has nothing to do with institutions. We have reported a short time ago that domestic bubble memories, which represent a promising development in computer technology, were developed in a joint project by the KFKI [Central Physics Research Institute] and the MOM [Hungarian Optical Works]. The work was performed by experts of the KFKI and the MOM; neither of the two institutions alone could have achieved these results without the practical experience and knowledge of the researchers and the engineers. We may also add that the achievemt was generated at the best possible place. But at the same time, I can also cite an example where the two partners have not cooperated well. We have started the development of floppy disks, which are also needed in computer technology, under the same conditions as prevailed in the development of the bubble memories. Yet, no results were achieved. MOM manufactures floppy disks on the basis of a foreign licence, while the "achievement" took since place at the KFKI.

It seems to me that the decisive factor for the implementation of the research achievements is not a poorly functioning institutional framework. Let us distinguish between two aspects of research. We may conduct research "simply" because the subject matter is interesting. In the event that industry "monitors" such projects, it may be lucky and find results which it can implement. These projects are usually carried out outside of industry, although some truly major enterprises, such as IBM, Siemens, and other major enterprises, can afford such "games," hoping to hit accidentally on new

applications from esoteric research projects. As a matter of fact, a frequently used advertisement of IBM boasts that large numbers of scientists who had been awarded the Nobel Prize have worked or do work at its laboratories! In other projects, the researchers have agreed with industry to work on projects which could result in the development of new products.

Let us examine the former type of research in some detail. According to the researcher, the result takes much less time to achieve than according to the industry. This is so since once the essential discovery has been made, this is followed by a less inspiring "detail" work, which for the researcher is no longer an exciting intellectual activity but robot-like work. The researcher thus tends to feel that he should stop and proceed with another project which to him is more exciting. But industry cannot do anything with these half-finished results. As a result we have "the beautiful, clever researcher" and the "ugly, stupid industry." We speak of a large gap. There can be no question that in Hungary there is indeed a gap between industry and research; however, this gap is not so much qualitative but merely one representing differences in approach. Industry cannot use the "finished" result and the researcher cannot understand what it is that industry cannot understand. I speak of my own experience when I say that only those achievements have been implemented to far which were carried by the KFKI to the experimental-manufacturing stage. My opinion is that the achievements cannot be acquired, they have to be transferred. There are two ways of transfer: one way means the "taking over" of the experimental series, engineering documentation, and so forth; the other way means that the appropriate experts go to industry in cases where industry is interested in manufacture.

[Question] Does the latter ever happen in Hungary?

[Answer] Unfortunately, this does not happen often. But it is a fact that industry has manufactured those of the instruments and instrument families developed at the KFKI for which the "parents" have followed the "babies." An example for this is the manufacture of nuclear instruments — engineers who have transferred from the KFKI to the Gamma Works participated in the production of the first instruments. On the other hand, we could learn much from Gamma in the areas of systematic development and the implementation of purchased licences. The situation with the TPA-70 is similar. Here, four engineers transferred from KFKI to VILATI [Electrical Automation Institute]. Because of the low degree of mobility in Hungary, this does not happen very often, so that the alternative situation takes place more often. I selected the examples from the KFKI; however, the situation is also found in other institutions, be they industrial or academic.

However, the large institutions do have an advantage insofar as the start-up and continuation of themes is concerned. This is not only because of their larger technical base, so that they can carry the risks involved easier. As a matter of fact, the KFKI starts 10-20 themes "at its own risk" with the probability of about half of them being successful, contributing to the reputation and fortunes of the institute. General Director Ferenc Szabo reported at the XIIth Party Congress that the taxes paid by the KFKI for its manufacturing activities approximately equal the budgetary funds allocated to it. A smaller institution starts two or three themes, and if none of them is successful, the institution is ruined both in financial and in reputation terms. This is why relatively small institutions start out to work on contractual projects. They cannot afford the risks involved. But this is an unhealthy situation since there are themes which initially appeal only to researchers, without appearing interesting to industry, yet which could lead to major achievements if successfully completed. This indicates that relatively small institutions cannot initiate truly perspectivistic, novel research projects. In Hungary, everything depends on the skill of the researchers and their good, primarily informal, relations with industry. This determines the stage at which the theme can be offered to industry, when industry is prepared to provide funding, or when industry is pepared to assign staff for joint development.

[Question] Let us go back for a moment to the production-related activities of the KFKI. It is a well-known fact that the institute manufactures the TPA computers, presently the TPAi. Rumors mention a volume of the order of magnitude of billions, but it is also said that this is one of the most expensively operating manufacturing entities.

[Answer] Both "rumors" have a basis of fact. A production value of six million forints is created per worker in our institute. We all know that this is peposterous, but the fact is that it includes the work of the enterprises who work for us for a fee, as well as the work of some cooperatives. We know for a fact that our instruments and other products cannot be manufactured more economically than this if we consider the numbers of units made of each product. In my opinion, there is presently a great need for the production carried out within the KFKI, even though it is a fact that this is a necessary evil. For example, nowhere in Hungary could we find the expertise and technological discipline for the manufacture and assembly of the computers developed by us -- especially for production startup -- except at the KFKI. The superior trained-worker team working at KFKI has been, and still is, capable of performing well above the national technical level. It is true that those skilled workers who started the work are today

already engineers, technicians, or foremen; however, they did train young people whose work today is indispensable for successful development.

[Question] The science-policy resolution of the Council of Ministers last year dealt with the restructuring of the research network. How will this affect the implementation of scientific achievements?

[Answer] The KFKI will remain a research center and it is hoped that it will continue to utilize the intellectual capacity which it has built up, and that it will continue to produce results of the caliber it has produced before. Other institutions -- and this applies primarily to industrial research institutions -- will become individual enterprises or will affiliate with an appropriate industrial enterprise. The large institutions -- which operate like the KFKI -- will continue to be able to offer their accomplishments to industry in a "digestible" form, and the research institutions of industry will obviously get closer to production, so that they will enjoy the fortunes together with those of the enterprise (or will share its misfortunes).

[Question] The resolution mentioned above prescribes the more concentrated and more effective utilization of the available resources. This obviously also means that the number of research themes must be reduced. To some extent this means a restriction of the freedom of research since the researcher will no longer be free to select his themes, and will have to join one team or another. Would this not throw Hungarian science back, just at a time when its primary goal is to catch up with (or come closer to) the international level for contributing to economic development?

[Answer] The technological and engineering level of the nation is presently such that it could not handle the "rate" of its own development. If we were to wait for the new technologies to be realized on the basis of domestic patents -- which is not even done in countries which are much larger and richer than Hungary -- the chances of catching up (or, let us be more realistic, maintaining our level) would seriously decrease. As a matter of fact, we would drop further down from the international level. Our situation is such that at the present time the most important activity is the selection of the most suitable foreign technologies and their successful implementation.

Now we have come to the subject of licence procurement. What should we acquire? This question can be answered only by people who have the expertise in the subject matter involved or, even better, who have themselves carried out research in the field and who have monitored the latest achievements.

As a matter of fact, expertise will be also required for the implementation of the licence, even in cases where the seller has provided plenty of know-how with the licence. Also, for the researcher involved in the project it means very much to become thoroughly acquainted with advanced technologies in his field, more than painfully laboring on the development of an earlier, often obsolete, version of the technology concerned (this if often the case not so much because of his own deficiencies but because of the limited financial resources of our country).

I am myself a believer in licences. For example, when VIDEOTON has purchased the licence from CII (the basis of the R-10 small computer), I was a member of the three-member committee which made the relevant decision. I have voted in favor of the licence in spite of the fact that the alternative version was the TPA which was developed in the KFKI. The technical level of the CII computer was higher, the engineering documentation was more advanced, and -- which is especially important then, as it is always -- the licence was accompanied by more than adequate know-how (an essential requirement especially for starting computer manufacture).

The state of the electronics industry, my specialty, shows how poorly we stand in Hungary in the field of licence procurement. The experts do not travel enough; they are unfamiliar with the international field and the international economic conditions. As a result, they do not always purchase the licence which would be most needed or which would be the most favorable. As a matter of fact, once the licence has been purchased, they usually "save" by canceling foreign trips of the researchers. In Hungary, a trip abroad is still regarded as a "junket," especially by those who do not travel or do not know what travel is all about. We do save a few hundreds or thousands of forints, but we tend to lose millions, which we can ill afford, when the technology is started up. We should learn something from the Japanese in this respect. Their experts "inundate" the world and they learn whatever they can. Once back home, they earn interest on the accumulated intellectual capital. The results are known by everybody.

[Question] Concentration of the resources could also mean that the existing funds are divided among fewer researchers. This means that the number of researchers will decrease. What is you opinion about this?

[Answer] If you ask me, this is not too bad. Many individuals who are unsuitable for research work have accumulated in the research institutions during the period of intensive growth. One reason for this was that the leaders were "good people" who never fired anyone. Another reason was that they had to retract when they tried to thin out the ranks, because of social

pressure. It is conceivable that the worsening conditions will lead to a desirable self-purification. But the reduction of staff must be made with the greatest possible circumspection. We must make sure that place in the institutions remains available for talented young researchers. Insofar as the "renovation" is concerned, I have already proposed -- not quite jokingly -- that we should establish "mock departments" where incompetent researchers can vegetate until retirement time. They would continue to draw salary provided that they undertake to do nothing. The sums expended for salaries are dwarfed by the costs for material, energy, instruments, unnecessarily tied up intellectual and technical capacity, and the like. The capacities thus made available could be used by talented researchers for worthwhile projects.

All depends on what we call basic research. According to the etymological dictionary: research aimed at obtaining new scientific knowledge, forming the basis of applied research. Little of such research is being conducted in Hungary in the natural sciences (physics, some areas of biology, and so forth). I think that not all research is basic research just because it does not yield practical results. It is indeed necessary to cultivate esoteric themes at a high level; every cultured state can afford the luxury of having some particularly talented individuals studying what they like. The state must make this possible. But it is not true that "high-level" research is only possible in these areas. To be truthful, we must add that it is quite difficult to achieve good results in applied sciences in a country such as Hungary, which is backward in scientific and technical terms. But this does not mean that talented individuals have the only choice of conducting basic research, especially not during adverse economic times. It may sound sacrilegous but I do maintain that the country needs not 'potential Nobel-Prize winners' but well-trained 'research tradesmen' who, in cooperation with industrial experts, contribute to advancing the technological level and the meaningful restructuring of the product structure. Our goal in the various scientific forums and societies is to provide a balance between basic and applied research in Hungary: High-level and effective applied research not based on voluntary basic research should produce more useful results, so that, together with licence procurement and implementation, the badly needed improvement of the technological level of the country can be finally made to become a reality.

2542
CSO: 2502

INFORMATION COOPERATION IN SOCIAL SCIENCES

Budapest MAGYAR TUDOMANY in Hungarian No 3 Mar 81 pp 215-217

[Article by Lajos Palvolgyi]

[Text] The role of social sciences today becomes increasingly important; thus, the task of improving the availability of information for this discipline becomes increasingly urgent. Experience tells us that a well thought-out development of information services is one of the most rewarding investments. The level, organization, and technical quality of information systems in the field of social sciences is not in line with the increased tasks facing social sciences and, in spite of accelerated advancement, still trails the information services available to other disciplines in the whole world. In Hungary, this is particularly so.

The Government Science-Policy Committee (TPB) dealt with the improvement of information for social sciences in early 1974 and also in June 1976. It authorized the Social-Sciences Coordinating Committee (TKB) to develop the guidelines for development. The Social Sciences Information Working Committee (TIM), an operating organ of the TKB and the Ministry of Culture, was established in 1977. The plan developed does not cover the full range of problems concerning the development of an information system for the social sciences; it deals only with one major aspect of it, namely the utilization of computer technology and cooperation related to it. The TPB has approved the proposed principles of cooperation. The TIM was authorized to proceed with the development of a more detailed system design, which is to be coordinated with the appropriate higher authorities.

The new document was completed in May 1980. The proposal contains several new elements, to supplement the earlier concept, aimed at the establishment of an information system based on voluntary cooperation of decentralized specialized centers in the area of social sciences. However, this concept assumed organizational, stimulating (influencing) and guiding possibilities on the part of the specialist centers. The libraries playing the

role of specialized centers so far do not have this potential, and it is unlikely that they will have it in the foreseeable future. The conditions for establishing the cooperation have somewhat changed in the meantime. The utilization of computer technology became necessary and also a realistic possibility. The plan continues to regard the functions assigned to the specialized centers, outlined earlier, as of decisive importance, but points out that there is also a need for a coordinating organ for the cooperative effort.

The plan summarizes the cooperation in the field of information for social sciences permitting the logical and economical utilization of computer technology (and also the development work required for it) in accordance with earlier resolutions:

1. The basic prerequisite of the cooperation is a unified concept, based on preparatory studies, for the entire field of information for the social sciences, a concept which is sufficiently comprehensive for providing an appropriate theoretical basis and practical orientation for the diversified development effort to ensure systematic and ongoing development, the elimination of unnecessary duplications and so-called white areas, and compatibility in the broadest sense of the term.

2. The cooperation in the field of computerized information service for the social sciences is to be part of the national literature information service system; it is to be established on the basis of voluntary participation and gradual development. The first stage, lasting until 1985, is expected to cover earlier-designated areas of major importance (politics, political and legal sciences, economics, sociology, and educational sciences). These are the areas where computerization would be the most advantageous.

3. The proposed cooperation should develop on the basis of cooperation among national specialized centers and information agencies grouped around them. The unified system of cooperation can only be realized on the basis of the recognition of mutual interests. Another important prerequisite is that the mutual interest is embodied in contractual agreements among the national specialized centers concerned.

4. A new element in the establishment of the cooperation is that, from 1980, the computer-technology basis of the MTA [Hungarian Academy of Sciences] permits the storage and retrieval of large amounts of information. The modern hardware and software potential to be available within the MTA in itself represents a powerful organizational base. Accordingly, it is our

recommendation to base the cooperative effort essentially on the computer-technology background of the MTA. The joint data base to be stored in the computer would be built up in part from foreign sources — such as the MISZON (Moscow), NTMIR (Moscow), ISI (Philadelphia), and CNRS (Paris [expansions unknown] -- and in part from information developed by ourselves. The latter might supplement the foreign data or, in some instances, may be independent. In view of the fact that social sciences have unique needs of their own, we must later consider a databank-like storage and processing of the empirical research data also.

5. The structure established as a result of the cooperative effort, which is unified and at the same time decentralized, could also store and supply the input data originating from various sources in a centralized manner to the extent that this is required and feasible. This would generally be accomplished through the national specialist centers. The central computerized storage should include primarily those data which are important from an interdisciplinary point of view and/or are important for scientific or application purposes. It should be continuously upgraded and operate economically.

6. The cooperating national specialist centers and other information-related institutions may use the services of the central data base of the system proposed on the basis of contractual agreements. Of course, they may add to the data base and its services to meet their specialized needs. The central computer service might assist in these efforts.

Technical and Engineering Conditions

The proposal then discusses the technical and engineering conditions of the cooperative effort, as well as matters related to the development of the information infrastructure. Over the long range it expects the computer and terminal network of the MTA to be connected to the educational service now under development. During the subsequent period the main goal will be to contribute to the compatibility of the institutions participating in the scheme and to enable their services to provide input and output into and from the computer system. But this is not merely a matter of technology; the specialist centers within the scheme will have to be staffed with subject specialists and informatics specialists and linguists. It is also important to precisely clarify the information requirements; research/development work for ongoing development, systematic promotion of information cooperation with other countries, and and a coordinated information/training/education system related to the services provided are also highly important.

The computer-assisted cooperation could provide information of various types and depths quickly, and some of its services could not be provided by conventional means at all. Typical services during the next stage of development could be the following: retrospective information retrieval from the literature to obtain well-defined subject bibliographies, personalized selective information dissemination in specific areas, current contents distribution for individual needs, citation coverage, and perhaps also monitoring of studies in related disciplines. During the first five years of the cooperative effort, it would also be possible to use or develop a social-sciences information data base resulting from eight to 10 different sources (part foreign and part foreign/domestic). The proposal analyzes all these subjects in detail.

Organizational and Legal Aspects

The organizational and legal aspects of the cooperative effort are also adequately covered in the proposal. Since the national specialist centers participating in the cooperative effort will be responsible for individual sectors of the information system, they will have to receive certain development potential. This, however, is not solely the job of the institutions concerned; it is a lso a government responsibility. It seems that the comprehensive management of the financial, legal, and organizational matters involved could be best handled on the basis of multilateral agreements within the existing legal framework, preferably in the form of associations formed by those interested in similar information. Such associations, operating under the umbrella of the MTA, would operate on the basis of detailed administrative and operational rules, still to be formulated. Their coordinating body would be a group made up from representatives of the participating national specialist centers, major information institutions, users, and government bodies concerned. The library of the MTA would act as the administrative secretariat of the association. The central computer-technology service of the association would handle the joint data base, and would be responsible for the operational and development activities related to the central computer-technology services.

The TKB has discussed in May 1980 the new model of the computer-based information cooperation in the field of social sciences, which is novel in many respects. Many important considerations have emerged in the discussion. Those participating in the discussion drew attention to the need for a new approach and for appropriate public relations and training services: the researchers must be prepared for the use of the new potentialities.

They stressed the importance of the unification of disciplinarity and interdisciplinarity, pointing out that it would be wrong to give undue emphasis to the latter. Insofar as the second point of the guidelines was concerned, the attitude emerged that in addition to the major disciplines listed, development should also be started — in part on the basis of foreign relations — on development in areas that could be more properly classified as so-called human sciences such as historical sciences, literary sciences, and linguistics. The point was made during the discussions that the coordinating role of the library of the University of Economic Sciences should be assured in the area of economic information.

The TKB has approved the proposal and asked those who prepared it to continue with planning on the basis of the subjects brought up in the course of the discussions, to define the special fields more precisely, to define the stages of development, and to proceed with the preparation of experimental information services. The TPB will take care of financing.

It is thus likely that, as a result of the additional development work, Hungary will have by the mid-1980's a unified information service system in the field of social sciences, a system with extensive international relations, operating with modern equipment, and providing the services in an economical and rational manner. But to ensure this, the supervisory organs must give more attention to the project, the researchers (and all users in general) must show increased interest, and the informational institutions must make the necessary changes in their attitudes.

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VETERINARY RADIATION MONITORING SYSTEM FOR LIVESTOCK PROPOSED

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[Article by Dr S. Buncic, Federal Committee for Agriculture, and Dr B. Petrovic, professor at the School of Veterinary Science of Belgrade University]

[Text] The provisions of the Law on Protection of Animals Against Infectious Diseases Threatening the Entire Country (SLUZBENI LIST SFRJ [OFFICIAL GAZETTE OF THE SOCIALIST FEDERAL REPUBLIC OF YUGOSLAVIA], No 43, 1976) prescribe veterinary public health by monitoring by inspectors of products, raw materials and waste products of animal origin, livestock feed and raw materials for its production for contamination with radioactive substances in addition to other harmful substances.

Proportions in the livestock ration have changed in present-day animal husbandry. Grain feeds have been reduced to half, and they have been replaced by an increased proportion of industrial by-products arising out of the industrial processing of agricultural products (flour, starch, beer, alcohol, sugar, oil, etc.).

Raw materials of animal and plant origin which are rich in proteins (fish, meat and blood meal, ground feathers, powdered milk and whey, poultry litter, soybean meal, alfalfa, field peas, horsebeans, etc.) constitute a sizable percentage of livestock feed.

Mineral substances (bone meal, iodized and noniodized salt, calcium carbonate, etc.), trace elements (copper, zinc, cobalt, iron, etc.), nitrogen-rich substances (urea, ureates, ammonium salts, etc.), amino acids, hormones and antibiotics are supplemental, but very important components of livestock feed as well.

This kind of composition of livestock feed requires constant and highly qualified specialized monitoring.

Contamination of the biological environment with radioactive substances is an important problem in the contemporary world. The contaminated environment has an immediate tendency to contaminate the cycle of plant and animal production because the air, soil, water, livestock feed and raw materials used for that production are contaminated with radioactive substances.

Man and animals are contaminated by radioactive substances through consumption of contaminated food or water and through inhalation of radioactive aerosols. It is therefore important to know the "danger point," or the amount of radioactive substances in all parts of the environment of life.

I. Radioecological Aspects of Livestock Production

The products of animal husbandry, which are very important in feeding the population, are exposed in today's world to the influence of various harmful factors. Aside from the numerous chemical and biological residues, there is also contamination with radioactive substances, and unless protective measures are taken, there is a danger that these quality foodstuffs will become harmful to man.

Sources of Contamination of the Environment With Radioactive Substances

Contamination of the environment with radioactive substances can occur because of increased natural and induced radioactivity.

Natural radioactivity in the biosphere dates from the formation of a majority of the chemical elements in the ground and radioactive elements that occur in the biosphere under the influence of cosmic radiations, and they can be classified by origin into three groups:

i. the first group of naturally radioactive elements which have practical importance consists of uranium (U^{238}), uranium (U^{235}) and thorium (Th^{232}) and the products of their decay;

ii. the second group of naturally radioactive elements is made up of chemical elements which are not members of the radioactive series, but they also came about in the period when the earth was formed. The most important members of this group are potassium (K^{40}) and rubidium (Rb^{87}). K^{40} is indeed the most widespread radioactive element in the earth;

iii. the third group of naturally radioactive elements is made up of radioisotopes constantly coming about in the biosphere under the influence of cosmic radiation. The most important among them are carbon (C^{14}), tritium (H^{3}) and beryllium (Be^{7}).

So, natural radioactivity in the biosphere depends on the content of natural radionuclides in the soil, on the magnitude and type of cosmic radiation and the geographic region on the earth. The level of this activity in a particular region is the natural background radiation.

Induced radioactivity. At the beginning of the 20th century scientists succeeded in smashing the atomic nucleus using various physical factors, most frequently by bombarding some element with alpha rays, and in that way caused radioactive emission. Immediately following each nuclear explosion about 200 induced radioactive isotopes, referred to as radionuclides, come into being.

Of all the radioactive isotopes which occur in a nuclear explosion, the biologically important radionuclides are the long-lived radioelements such as strontium

(Sr^{90}) and cesium (Cs^{137}), while cerium (Ce^{144}), barium (Ba^{140}) and iodine (I^{131}) are somewhat less important.

In a nuclear explosion 5-percent Sr^{90} and 6-percent Cs^{137} are formed (D. I. Sakutinski et al.).

Figures on the yield of Sr^{90} and Cs^{137} resulting from the nuclear explosions carried out between 1945 and the end of 1971 show that these activities were very significant in certain years, so that a total of 88 TBq of Sr^{90} and 111 TBq of Cs^{137} have been expelled into the natural environment. Since these are long-lived radionuclides, it can be said that a "new radiation nature" has thus been formed on the surface of the earth and that a new ecological factor has made its appearance.

The radionuclides Sr^{90} and cesium (Cs^{137}) are not normally found in the biosphere, and therefore any occurrence of these isotopes constitutes a contamination of the environment.

The occurrence of Sr^{90} and Cs^{137} in the biosphere alters the ecological pattern of their circulation as compared to stable strontium or cesium. Stable strontium and stable cesium are to be found in rocks and the soil, whence they commence their circulation in one of the cycles of the ecological system, while Sr^{90} and Cs^{137} originating in nuclear explosions commence their primary circulation from the air, that is, fallout.

Research has shown that the Sr^{90} and Cs^{137} in fallout following nuclear explosions hold fast in the upper surface layers of the soil at a depth of about 10 cm of the surface layer. It has also been found that both radionuclides are to be found in considerable quantities in leaf litter. About 50 percent of the deposits of radionuclides from radioactive fallout can be found in leaf litter and the soil, while the other half of the radioactivity is to be found in the vegetation. This means that a major portion of the radioactive fallout is to be found after just a few years in the soil--plant--microbes--soil cycle (Ritchie, R. C. et al., 1970).

II. Radiation Health and Safety Measures With Respect to Livestock Production

As a consequence of the mechanisms of the biological effect of ionizing radiations damage occurs in living matter that is manifested as the function of the quantum of radiation energy: from disturbances in the synthesis of nucleic acids to the occurrence of mutagenesis.

Changes induced by radiation may be manifested immediately after irradiation or at an interval of a few days, weeks, months or years.

Contamination of animals and man with radioactive substances may be direct, which is the most frequent case under exceptional conditions, and it may also be indirect, or alimentary.

Indirect or alimentary contamination is the most common type of contamination of organisms living in an environment which is contaminated with radioactive substances. This pattern of contamination is also much more dangerous, since it may

be long lasting as a consequence of subvisible changes and may permanently contaminate a large number of animals and human beings.

Contamination of livestock feed of plant origin usually occurs in the field in the phase of growth and maturation, while contamination of protein raw materials of animal origin derives from the contaminated organisms of the animals.

Grains may become contaminated, even to a high level, if the fallout of radionuclides has occurred during their development and particularly if there has been direct contamination through the flower (floral contamination). If long-lived radionuclides reach the earth, in addition to floral and foliar contamination, there also may be contamination during the growth of the crop through the plant's roots. Soluble radioactive material around the plant's roots is easily absorbed over a period of several weeks or months, and therefore absorption through the root of the plant is often the principal route by which radionuclides from fallout find their way into livestock feed.

On lush pastures a major part of the radioactive fallout goes no further than the lodged blades of grass, stems and roots above the surface, while a smaller portion enters the soil itself. This is the reason why pastures are the best indicators of radioactive contamination. Especially in light of the fact that one cow can graze more than 100 square meters a day and the fact that the radionuclides Sr^{90} and Cs^{137} are rapidly carried into the meat, so that their average level per kilogram of meat may be fivefold higher than the level per liter of milk. Nevertheless, particular attention should be paid to milk in the veterinary radiation monitoring system, since in a lactating cow there is a short time interval between the intake of food contaminated with radioactive substances to secretion of the milk and rapid consumption as a food.

Milk and dairy products are important foods in the diet, especially in the nutrition of children, who even on a physiological basis take in considerably larger doses of radiation than older persons. Because of the short interval from the intake of the radionuclides into the cow's organism and secretion in the milk, even short-lived radionuclides may be found in the milk, and here iodine (I^{131}) is particularly important.

Protein nutrients of animal origin are being used more and more as livestock feed. Every year our country is importing more than 60,000 tons of fish meal as the principal protein raw material of animal origin. The fish meal imported originates mainly in fish caught in the Pacific and Atlantic oceans and the large seas and large rivers. The floodwaters of large international rivers may carry radionuclides and may be a source of contamination of large areas of land, especially if the water from these rivers is used in a crop irrigation system. In fresh riverwater the concentration of potassium is one one-hundredth of the potassium concentration in salty seawater, and the coefficient of accumulation of cesium in the biota of fresh water is higher than in salt water.

Additives and various biological stimulants added to livestock feed contain trace elements, usually stable chemical elements, but it is not precluded that they may contain unstable isotopes as well.

III. Legislation and Legal Regulation

Since legislation has prohibited the production, sale and use of livestock feed and raw materials used in its production if they contain more than the permissible amounts of radioactive substances, among other things, animals and products and raw materials of animal origin, livestock feed and raw materials for livestock feed production must be protected from contamination with radioactive substances.

On the basis of the Law on Protection Against Ionizing Radiation (SLUZBENI LIST SFRJ, No 54, 1976), whose enforcement lies in the jurisdiction of the Federal Committee for Labor, Health and Social Welfare, the Regulation on Testing for Contamination With Radioactive Substances of the Air, Soil, Rivers, Lakes and Seas, Solid and Liquid Precipitation, Drinking Water, Food and Livestock Feed (SLUZBENI LIST SFRJ, No 63, 1977) was adopted during 1977.

On the basis of that law and that regulation our country's health service organized a radiation monitoring system which is in our opinion incomplete and inadequate for health and safety radiation monitoring in livestock production.

The provisions of Article 6 of the Law on Protection Against Ionizing Radiations prescribe that contamination of the air, soil, rivers, lakes and the sea with radioactive substances shall be systematically studied in order to prevent hazards from ionizing radiation in good time. These tests are performed at the sites, with the methods and within the intervals specified by a regulation of the /competent federal agency/, and they are performed by health-service and /other specialized and scientific/ organizations of associated labor as designated by the regulation of the competent /republic/ or /provincial/ agency (emphasis supplied by the authors) [material enclosed in slant lines italicized in the original].

Article 30 of the same law specifies that the Federal Committee for Labor, Health and Social Welfare shall enact more detailed regulations in this field subject to consent of other federal agencies. The regulation we have mentioned has already been enacted on the basis of that article of the law, and its Article 25 prescribes that "contamination of livestock feed with radioactive substances shall be investigated; this shall cover silage, concentrate, hay, grass, etc., used to feed cows, heifers and young bulls, calves, hogs, sheep and poultry."

Protection against contamination with radioactive substances of animals, products, raw materials and waste products of animal origin, livestock feed and raw materials used in its production lies in the jurisdiction of the veterinary service, which is required to organize and implement preventive measures and radiation health and safety measures concerning livestock production (Law on Protection of Animals Against Infectious Diseases Threatening the Entire Country). On the basis of that law, whose enforcement lies in the jurisdiction of the Federal Committee for Agriculture, a regulation has already been enacted on procedure for performing standing veterinary public-health examination of animals for slaughter and products of animal origin (SLUZBENI LIST SFRJ, No 47, 1978). The provisions of that regulation prescribe that in evaluating the meat and organs of slaughtered animals, meat of shellfish, fish, frogs, snails and honey, the competent organ of the veterinary service shall check to see that contamination of those products with radioactive

substances does not exceed the maximum permissible concentrations envisaged by legislation in effect.

On the basis of the power granted by the law, the Federal Committee for Agriculture, with consent of the Federal Committee for Labor, Health and Social Welfare, is also preparing a regulation on the prohibited and maximum permissible amounts of harmful substances and ingredients in livestock feed. The provisions of that regulation also prescribe the maximum permissible values of radioactive substances.

The Law on Protection Against Ionizing Radiations prescribes that the competent federal agency shall prescribe the sites, methods and intervals for testing for contamination with radioactive substances, and then the Regulation on Testing for Contamination With Radioactive Substances, which was adopted by the Federal Committee for Labor, Health and Social Welfare, makes it possible to organize a veterinary radiation monitoring system as a part of the overall radiation monitoring system.

IV. Proposed Model for Health and Safety Protection Against Radiation in Livestock Production

On the basis of a familiarity with the specialized literature on organizing the health and safety protection against radiation in livestock production and our own know-how acquired in the 4 years of operation of the border veterinary radiometric station, as well as on the basis of the obligation arising out of the Law on Protecting Animals Against Infectious Diseases Threatening the Entire Country, the Federal Committee for Agriculture has drawn up a proposal for organization of the veterinary radiation monitoring (VRM) system for the entire country; that is, it has submitted a proposal for a systematic and lasting solution for health and safety radiation monitoring and for protection of livestock production in our country.

The Veterinary Radiation Monitoring System (VRMS) is to be organized from the Federation, the republics and provinces, to the regions and opstinas.

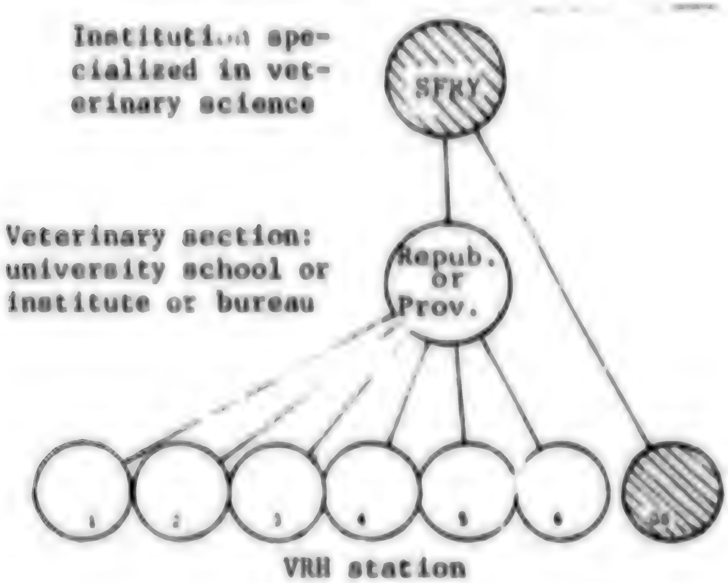
The veterinary service at the federal, republic and provincial level is to have one veterinary institution (specialized in scientific research). At the level of the republic or province this institution, for which the title Veterinary Radiation Hygiene Section (VRH section) has been proposed, is to be responsible for and the organizer of all efforts to protect from radiation and contamination animals, products and raw materials of animal origin, livestock feed, raw materials and additives used in feed production, and water used for animals within the respective republic or province. The VRH section at the federal level would administer and offer specialized aid to VRH stations at border crossings and would collaborate with the VRH sections in the republics and provinces.

The organization of the VRM system can be set up in phases.

In the first phase the competent agency for the veterinary service in the republic or province would designate the existing veterinary institution already working on protection against radiation and radiation hygiene as the VRH section. The republic or province which does not at present have such a veterinary institution could

designate one such institution in a neighboring republic or province as its VRH section. The veterinary service at the federal level already has such a contract with the Radiology Department of the School of Veterinary Science in Belgrade.

Organization Chart of the VRM System



1. Veterinary station or
2. Veterinary diagnostic station or
3. Veterinary livestock station or
4. Veterinary service on socialized farms or
5. Laboratory in livestock feed mills or
6. Laboratory in packinghouses.

GS Border veterinary station

The circles shaded in with slant lines indicate parts of the VRM system which already exist.

The taking and sending of samples from the field to the VRH section of the republic or province to be tested for radiocontamination would be done by the veterinary inspectorates in opstinas, packinghouses, livestock feed mixing mills, dairies and markets, in conformity with the program of the competent VRH section.

In the second phase all republics and provinces would have organized VRH sections, and the more advanced republics and provinces would already have VRH stations.

In the third phase all republics and provinces would have not only the VRH sections which were already organized, but also they would have organized VRH stations.

The VRH sections and VRH stations also have a very important role in protecting the public, since in case of an emergency each of these institutions could function independently and would afford a high degree of safety.

V. Matters in the Competence of the VRH Sections and VRH Stations

In addition to organizing and directing the VRM system within the republic or province, the VRH sections would also perform the following tasks:

i. monitor and record the average values of the base level of radiation (background) on the entire territory of the republic, which it will do according to reports it receives in VRH stations;

ii. identify the source of radiation in samples with elevated total beta-gamma radiation submitted by VRH stations, and, in the first phase of organizing the system, all samples sent by veterinary inspectorates;

iii. organize research work in the field where radiation is high and collaborate with other services and institutions in the radiation field;

iv. keep records on organizations of associated labor using radioisotopes or nuclear energy in their operation;

v. collaborate with the YPA [Yugoslav People's Army], territorial national defense and social self-protection in testing for and protecting against radiation under both peacetime and emergency conditions;

vi. prepare quarterly and annual reports on the level of the natural and induced radiation background, on the number of samples examined and the results from the samples tested;

vii. issue or certify the veterinary health certificate on the level of contamination with radioactive substances of products, raw materials of animal origin and livestock feed intended for domestic use or for export;

viii. issue a recommendation to the competent agencies of the veterinary service in the republic or province on procedure to be followed in combating high contamination with radioactive substances of livestock feed and products and raw materials of animal origin;

ix. do scientific work in the field of veterinary radiation hygiene, and so on.

The veterinary radiation hygiene station (VRH station) should be established where the potential conditions exist for possible contamination with radioactive substances, such as the following: large pasture areas used for grazing livestock or for gathering hay; large regions where concentrated livestock feed is produced; regions in the immediate vicinity of nuclear plants or large industrial centers and urban environments where open sources of radiation are used for various purposes; regions through which international rivers flow, regions along the seacoast, etc.

The VRH st ions can be established in existing veterinary and veterinary diagnostic stations, in veterinary livestock centers, attached to veterinary services on large socialized farms and attached to laboratories in livestock feed mills and packinghouses.

There may be one or several VRH stations for one or several opstinas. If in one or several opstinas there are only pasture areas and areas for production of coarse and concentrated livestock feed, then the VRH station can be organized in the veterinary station or veterinary diagnostic center, i.e., in the veterinary organization of associated labor operating in that area. If in the opstina there is a livestock feed mill or packinghouse which has its own laboratory with veterinary specialists on the staff, then the VRH station can be organized in association with that laboratory for that opstina and even for neighboring opstinas as well. If in the area covered by one or more opstinas there is a large socialized farm with numerous veterinary specialists and an organized outpatient service, the VRH station may be organized on the farm itself to meet the needs of one or more opstinas. If within some opstina there is a nuclear installation (nuclear power plant, reactors, accelerators, disposal grounds for nuclear waste, etc.), the VRH station may be organized right at that installation.

The VRH station should perform the following tasks:

i. measuring the level of base activity (background) twice daily, and when samples are being measured, then measuring the background before measurement of the sample begins and also upon completion of the work;

ii. recording the values of daily measurements of the background on the specified forms and working out the daily and weekly mean values by means of diagrams;

iii. the taking and preparation of samples for testing or to be sent to the VRH section for further studies.

The VRH section draws up the work program of the VRH station. The program should contain the time and procedure for taking samples, the type of products or substances to be studied, the manner in which the sample should be prepared, the criteria to be used in evaluating the sample that has been tested, and in the case of an augmented source of radiation the specified number of pulses in the sample being tested requiring it to be sent to the VRH section for identification of the source of augmented radiation.

Instrumentation and Equipment of the VRH Section and VRH [illegible]ation

The instrumentation for the VRM system should be manufactured in Yugoslavia, should afford measurement with the allowed deviation from absolute accuracy, should be practical in handling, should be portable and should be adapted for line or battery power supply.

Instrumentation for the VRH Section

The VRH section should be equipped with instruments that make it possible to identify sources of radiation, the type of radiation, the chemical composition and amount of a radioactive substance, and so on.

1. The LOLA-4 device for measuring nuclear radiation or the modified LARA-5, which are manufactured by the Boris Kidric Institute for Nuclear Sciences in Vinca. The

samples to be measured are processed by the mineralization procedure and are measured by the "thin sample" method. These counters make it possible to measure low beta activity, which is indicated as UBA, which means that the beta-emitting radionuclides present are not identified;

2. A gamma spectrometer;

3. A radiation chemical laboratory;

4. Furnace for mineralizing samples.

Instrumentation for the VRH Station

The instrumentation for the VRH station should make it possible to rapidly detect radioactive substances (beta-gamma emitters) in all phases of livestock and livestock-product production.

1. The LARA-GS nuclear radiation measurement laboratory manufactured by the Boris Kidric Institute for Nuclear Science in Vinca. This laboratory consists of the counter and its accessories and equipment for taking and preparing samples.

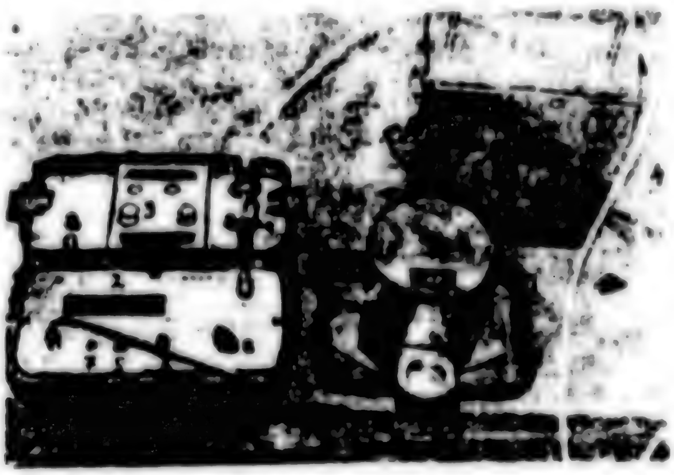


Figure 1. Connections of the LARA-GS nuclear radiation measurement laboratory: 1--lead container; 2--SVIT-10 scaler; 3--high-voltage rectifier; 4--electric power source; 5--start; 6--stop; 7--signal light; 8--switch for measuring time; 9--on-off switch; 10--battery connection; 11--shelf.

2. The counter and accessories consist of the lead container in which the GM (Geiger-Muller) is located and the SVIT-10 scaler. The entire counter can be carried and is suitable for field work, and it operates both on line power (220 V) or a 12-V battery.

The equipment for taking and preparing samples consists of several aluminum vessels (little bowls) of specified size and shape according to the size of the shelf in the lead container, to receive between 8 and 10 grams of material being tested, and it has a cutter, a shaper, a porcelain and Teflon vessel and a heating element for drying a wet sample.

3. The KOMO-TM radiation and contamination monitor, which is manufactured by the Boris Kidric Institute for Nuclear Sciences in Vinca. This instrument is also portable, operates on battery and is suitable for checking coarse feeds and containers and also for monitoring the presence of open sources of ionizing radiation.

Training Veterinary Specialists in Protection Against Radiation and Radiation Hygiene

In view of the role, tasks and sphere of activity of veterinary specialists in protection against radiation and especially in radiation hygiene of livestock production, schools of veterinary science are attributing great importance to this scientific discipline, and it is an integral part of the curriculum.

All the instruction in theory is accompanied by appropriate forms of practical instruction whose purpose is to introduce the students to the methodology of using the instruments for detecting sources and determining types of radiation and to equip them to handle the instruments themselves as well as to organize and carry out protective and preventive measures.

Aside from these regular and required forms of education, seminars and courses in innovations and also symposiums treating current scientific and technical questions have an important place in equipping veterinary specialists to work in the field of protection against radiation and radiation hygiene in livestock production.

This means that veterinary specialists are trained and fit to perform the tasks of protection against radiation within the veterinary radiation system.

Personnel in the VRH Section and VRH Station

With respect to competence and the specific nature of the tasks, the VRH section must have a veterinary specialist with strictly professional education and an academic degree in protection against radiation and radiation hygiene of livestock production, and he is the head of the VRH section. Aside from its director, the VRH section should also have one junior veterinary specialist occupying the position of staff specialist, one laboratory assistant and one general assistant (see the diagram).

Personnel in the VRH Station

The tasks in the VRH station can be performed by any veterinary specialist who has gone through a short seminar in protection against radiation and radiation hygiene of livestock production. Since the tasks in the veterinary radiation monitoring system must conform to time intervals and are not daily, except for measuring the base level of radiation (background), the tasks of the VRH station can be turned over to any veterinary organization or any laboratory in which veterinary specialists are employed, whichever is the most suitable.

The veterinary organization or laboratory in a livestock feed mill or packinghouse which undertakes to organize the VRH station and perform its tasks will through seminars equip one of its specialists to perform those tasks.

The time intervals, procedures and sites for taking samples and for testing shall be done according to the program of the VRH section, which is subject to approval of the competent veterinary agency in the republic or province and the Federation.

The taking of samples by veterinary inspectors to be tested for radiation lies in the competence of the veterinary inspectorate, but these tasks may also be entrusted to a work organization performing the tasks of the VRH station.

Methods and Possibilities of Obtaining Funds To Perform the Tasks and Purchase Equipment for VRH Sections and Stations

The provisions of Articles 8 and 9 of the Law on Protection of Animals Against Infectious Diseases Threatening the Entire Country* require veterinary services in the republics and provinces to organize veterinary public health inspection of livestock feed and raw materials of animal origin. The provisions of these articles are enforced by the competent veterinary inspectorate, which collects compensation in the form of an administrative fee for inspections performed. The funds "collected" are credited to special funds, one part going to the opstina budget and another portion to the budget of the republic or province.

The competent veterinary inspectorates sending samples for laboratory analysis shall collect for the costs of analysis and shipment from the work organizations whose material is being sent for testing, or this shall be paid out of the opstina budget.

Paragraph 2 of Article 8 of the law* already referred to prohibits the production, sale and use of livestock feed and raw materials used for its production if it contains larger than the permitted amounts of various substances, including radioactive substances. This means that the competent veterinary inspectorates are required to organize the monitoring of livestock feed and raw materials used in its production for radioactive contamination.

The regulation** on the procedure for performing regular veterinary public health examination of animals for slaughter and products of animal origin prescribes as follows: "that the competent body in evaluating meat and organs of slaughtered animals, meat of shellfish, fish, snails and honey, shall check to see that the contamination of these products with radioactive substances does not exceed the allowed limits."

The provisions of the law and the regulation afford the possibility, through the competent veterinary inspectorate, the VRH section and the VRH station, for a contract to be concluded with livestock feed producers and processers under which money compensation would be made for the mandatory monitoring of those products and raw materials for contamination with radioactive substances. The same procedure could also be applied to packinghouses, dairies and markets.

The VRH section is a veterinary scientific research institution specializing in protection against radiation and in radiation hygiene of livestock production in

* SLUZBENI LIST SFRJ, No 43, 1976.

** SLUZBENI LIST SFRJ, No 47, 1978.

the republic or province, and only the section may issue certificates; that is, it is on the basis of the findings of this institution that the competent veterinary inspectorates issue official certificates for products, raw materials and waste products of animal origin, for livestock feed and for raw materials used in its production.

There is also a possibility for the VRH section to be involved in solving specific problems that arise in protection against radiation and radiation hygiene of livestock production.

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